DOCUMENT RESUME

ED 102 048 SO 008 069

AUTHOR Jungblom, Edwin N.
TITLE An Interdisciplinary Program Incorporating Population Studies for Intermediate Grades. Sedro-Woolley Project Report No. 13.
INSTITUTION Western Washington State Coll., Bellingham. Huxley Coll. of Environmental Studies.
SPONS AGENCY National Center for Educational Research and Development (DHEW/OE), Washington, D.C.
PUB DATE Dec 71
NOTE 58p.; Related Documents: ED 058 126 and 129; ED 059 901; ED 059 947-950; ED 061 118; ED 066 363

EDRS PRICE MF-$0.76 HC-$3.32 PLUS POSTAGE
DESCRIPTORS Course Objectives; *Curriculum Development; Demography; Elementary Education; *Environmental Education; Evaluation Methods; Field Trips; Graphs; *Interdisciplinary Approach; Intermediate Grades; Junior High Schools; *Population Education; Population Trends; Questioning Techniques; *Social Studies; Teaching Methods; World Problems
IDENTIFIERS *Sedro Woolley Project

ABSTRACT

The publication contains exercises on population education which can be used in social studies and science classes in grades 4-7. Although the language of the material is geared to the intermediate grades, the exercises can easily be adapted for primary, high school, and adult education. The publication's major objective is to change the lifestyle of people or to alter drastically the values that people have about finite Spaceship Earth. Teaching techniques include readings; classroom discussions; gathering, collecting, and analyzing data; developing hypotheses and drawing conclusions from data; constructing graphs; research; field trips; and writing essays. The major portion of the publication contains exercises dealing with population explosion, famine, epidemic, health and sanitation, death rate, birth rate, growth rate, and population estimates. Unit objective, teaching methods, student resource material, questions for discussion, and evaluation techniques are provided for each topic. Specific issues to investigate and problem study areas are also provided. (Author/DN)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED102048

SE 008 069

HUXLEY COLLEGE
CENTER FOR ENVIRONMENTAL EDUCATION

AN INTERDISCIPLINARY PROGRAM INCORPORATING POPULATION STUDIES

for intermediate grades

Edwin N. Jungblom

Sedro-Woolley Project Report No. 13
December 1971
U.S.O.E. Project No. 0-0848
Grant No. OEG-0-70-5039

Huxley College of Environmental Studies
A Division of Western Washington State College
Bellingham, Washington 98225

00002

The research reported herein was performed pursuant to a grant with the U.S. Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

00003/4

TO THE TEACHER:

Presented here are ideas for multidisciplinary environmental education. The objectives of the ideas and methods suggested are clearly stated. The overall objective is to provide you, the teacher, with an aid in the development of your approach to teaching for and about the environment. These are not learning packages designed to be applied verbatim, but suggestions for ideas and methods that will enable you to develop learning packages. The contents of this report represent only the first treatment of the idea. It is published in this form in order that teachers may have an opportunity to experiment with it.

You will have to design your personal approach to environmental education. You are an environmental educator now, whether you realize it or not, because the environment is all around you and you are teaching about the environment that surrounds both you and your students. The state of the environment indicates that there is something wrong with the way in which you have learned to perceive and behave relative to the environment, and with the way you are teaching others to learn and behave in their environment today.

The ideas presented here are examples of ways in which you can incorporate environmentally beneficial learnings into your curriculum. The intent is not that you "add on" something specifically environmental to your curriculum, but that you incorporate environmental learnings into your treatments of the subject matter with which you have already been dealing. The specific manner in which you treat your responsibility to

00005

educate for environmental stewardship is up to you. It is hoped that these and many other ideas will help you in your effort to understand the meaning of "environmental education" and its implications for you as a teacher and as a human organism.

The environmental education development project of which this report is a part is an ongoing one, and it is hoped that all who attempt to use the report will participate in the project by reporting the results of their efforts to the project staff. The staff will compile the ideas and methods collected. This will enable all working on the development of environmental education to share each other's work and will promote the spirit of cooperation essential to the success of any project as broad as this one.

Please report the methods and results derived from your use of this report to:

John Miles, Director
Environmental Education Project
Huxley College of Environmental Studies
Bellingham, Washington 98225

Thank you.

00006

TABLE OF CONTENTS

TO THE TEACHER i

INTRODUCTION 1

Philosophy 1
Grade Level 2
Length of Study 2
Subject Area 2
Objectives 3

DEMOGRAPHY 5

Definition and Terms 5
Population Explosion 6
Famine 8
Epidemic 9
Health and Sanitation 10
Death Rate 11
Graph - Death Rate in Ceylon 13
Birth Rate 14
Graph - Birth Rate in Ceylon 15
Growth Rate 16
Problem 16
Graph - Birth, Death, and Natural Increase, Ceylon . 17
Population Estimates 18
Graph - Population Projections for four world Regions 19
Graph - Growth of United States Population 20
Table - World Population by Major Areas 21
Discussion Questions 23

ISSUES TO INVESTIGATE 25

Sedro Woolley - My Home Town 26
Table - Area and Population of Sedro Woolley 26
Where do Americans Live? 28
Table - The Urbanizing United States 28
The Automobile 30
Table - The Saga of the U.S. Passenger Car 30
Growth In Latin American Cities 32
Table - Growth of State Capitals 32

REVIEW AND PRACTICE 34

To The Student: This Is Overpopulation 34
Problem Study Areas 35

MAPS 37

South Asia 37
South Asia 38

09997

Asia 39
North America 40
The Wor'd 41
The World 42

BIBLIOGRAPHY 43

APPENDIX 44

How Did The Earth's Population Get So Big? 45

00008

AN INTERDISCIPLINARY PROGRAM INCORPORATING POPULATION STUDIES

INTRODUCTION

Philosophy

How many fish can live in a fish bowl? The number is finite. The earth is finite also. The earth cannot support unlimited numbers of people.

Population experts do not agree on the numbers of people that the earth will support. But all are concerned that if population growth continues at its present rate, a crisis must occur. What scientists don't know is when that crisis can be expected. Perhaps it is already upon us, but we don't recognize the symptoms.

We must concede that overpopulation is but a part of the problem, albeit in the minds of many it is the major problem. Man's abuse and misuse of his technology--pollution, waste, mismanagement of resources, are parts of the whole.

The capitalist system--the law of supply and demand--which has made the United States by far the most powerful country on the face of the earth is in direct conflict with some very fundamental concepts of nature and nature's balance of her systems. For example, is wise use of our natural resources compatible with economic growth?

No one has yet been able to make conclusive statements about the questions posed in this introduction. The questions and other similar ones are of such magnitude that perhaps they cannot be answered. But because they are our immediate concern they must become a very important part of our public school curriculum.

Grade Level

This material is designed for grades 4 through 7. Much of it could easily be adapted for primary or high school level, however. The language has purposely been geared to the intermediate grades.

Some of the concepts are complex and will require significant in-class discussion for in-depth understanding.

Length of Study

The length of time devoted to each of the experiences will vary considerably depending upon the teacher's knowledge and background in the area of population studies. The teacher who has had some training in population problems will be able to add his experience to the prepared material. I would suggest that the traditional classroom teacher will spend about four weeks on this material.

Subject Area

This material is mathematics-oriented, but population education should not be unidiscipline in nature. Population education is not just numbers, facts, and figures; population education is also that complicated and confusing realm of social and cultural tradition and values. It is the "what people do and why."

Population education should be an interdisciplinary thing, reaching into all disciplines, including the extra-curricular. Incorporated into this unit are exercises suitable for social studies, science, and valuable field trip experiences.

Finally, I would suggest that population education of the adult community must become in part at least a responsibility of the public schools. How this could be accomplished is not the purpose of this paper, but some of the material is very suitable for adult classes.

Objectives

There is perhaps one major objective of the unit--to change the lifestyle of people, or to alter drastically the values that people have about finite Spaceship Earth. Other objectives are as follows:

1. To know how to gather or collect data.
2. To know how to analyze data.
3. To know how to develop hypotheses from known data.
4. To know how to draw conclusions from known data.
5. To know the basic terminology of data collecting and analysis.
6. To know how to convert collected or given data to graphic form.
7. To know basic demography terminology.
8. To know that the world faces a problem of too many people for Spaceship Earth.
9. To know that the world's population is increasing very rapidly.
10. To know Why the world's population is increasing very rapidly.
11. To know that some extremely serious problems--social, political, economic, psychological, cultural--can be anticipated if the population becomes too great.
12. To know that the earth is finite.
13. To know that a finite earth cannot support an infinite number of people.
14. To know how to round off numbers to the nearest tenth, hundredth, thousandth, hundred thousandth, millionth and billionth.
15. To know the value of rounding off numbers.
16. To know how to construct a bar graph, broken line graph, picture graph, circle graph, and specialized forms of graphs.

17. To know that increasing populations affect land area, natural resources, productivity, mental well-being.

18. To know that land area, climate, terrain, natural resources, productivity, geographic location, mountains, soil fertility, rainfall, affect populations.

19. To know how to project future populations.

20. To know what has caused the declining death rate.

DEMOGRAPHY

Definition and Terms

WHAT IS THE STUDENT GOING TO LEARN? Demography is the scientific study of the changes of numbers of people. How do trends help us in making demographic predictions?

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student shall take known population data and make projections of what the future population might be.

Demographic trends are very basic to population studies. Population data can be put into many different kinds of charts and graphs that show population trends. This data can be imployed in terms of absolute numbers or in terms of percentages.

For example, demographers have been studying population data for years. By taking data from previous years, trends can be established and projections about the future may be made.

Demography - The scientific study of the changes in the numbers of people.

Data - The facts and information available from which ideas and conclusions can be drawn.

Chart - A sheet giving any kind of information in lists, pictures, tables, diagrams, etc.

Graph -

Absolute - Expressed in whole numbers, not fractions or percentages.

Percentage - A rate or portion of one hundred--part of one hundred.

Projection - By taking known data and carefully studying it, we make predictions or projections.

POPULATION EXPLOSION

WHAT WILL THE STUDENT LEARN? Why has the population of the world increased so dramatically in the past century?

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student will list the several causes of this rapid increase in population and then write a short essay about each, using at least one illustration for each specific reason.

Fundamentally, the cause of the population explosion is very simple--THERE HAVE BEEN MORE PEOPLE BORN THAN HAVE DIED. In demographic terms, we say THE BIRTH RATE EXCEEDS THE DEATH RATE.

For example, you live in Sunnyland, Washington, where the population on January 1, 1970, was 50,000. During the year Sunnyland recorded 1000 births, but only 700 deaths. This meant an increase of 300 people for the year.

50,000 + 1,000 - 700 = 50,300

During the year there are always people moving, or as demographers would say, migrating. Those who leave Sunnyland are emigrating, and those who move into Sunnyland are immigrating. For our purposes in this work we will not consider those people who migrate.

Population explosion - A coined phrase to suggest that the world is becoming frightfully over-populated. The advocates of "population explosion" insist that some sort of controls limiting the number of children people may have must be made a law.

Migrate - To move from one community to another or from one country to another.

Emigrate - To move away from a community to another.

Immigrate - To move into a community from another.

Questions

1. The population of Belltown, Wa., on January 1, 1970, was 2632. During the year there were 53 children born and only 39 people died. What was the year-end population?

2. In Snowville, Wa., the population on January 1, 1970, was 16,550. During the year there were 496 children born while only 240 deaths occurred. What was the population of Snowville on December 31, 1970?

3. In Smogville, Ca., the population was 694,800 on January 1, 1970. During the year 20,400 babies were born while only 13,575 persons died. What was the year-end population?

4. The population of Paradise, Montana, on January 1, 1970, was 3,726,408. During the year 121,302 children were born. The population at the end of the year was 3,772,904. How many deaths occurred during the year?

5. In the four cities discussed above, what was the total beginning of the year population? What was the total population increase? What was the total end of the year population?

FAMINE

WHAT WILL THE STUDENT LEARN? Civilized man with his advanced technology has been able to drastically reduce, though not completely eliminate, mass famine, postponing death and thereby reducing current deaths.

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student will write a short essay explaining how civilized man with his advanced technology has nearly eliminated mass famine, this being in part the cause of the population explosion.

Read Chapter III of People.*

Famine - A very serious shortage or scarcity of food causing hunger, starvation, and frequently death on a very large scale, such as hundreds of thousands of people.

Questions

1. If you lived 35,000 years ago, by what 3 ways would you get your food?
2. What does the author mean when he says "swing back and forth from feast to famine"?
3. Scientists estimate that man has inhabited (lived on) earth for how many years?
4. About 8,000 years ago man began doing things which changed his life very much. What were these things?
5. What does the author mean when he says "man was beginning to control his surroundings"?

*Robert C. Cook and Jane Lecth. People. Columbia Books Publishers, Wash., D.C., 1968. See appendix for text of Chapter III.

EPIDEMIC

WHAT WILL THE STUDENT LEARN? Civilized man with his advanced technology has been able to drastically reduce the incidence of epidemic-type mass-killing diseases, thus postponing death and reducing current deaths.

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student will write a short essay explaining how civilized man, with his advanced scientific technology has nearly eliminated the incidence of epidemic-type mass-killing diseases, thus postponing death and adding to the current population problem.

Read Chapter III of People.

Epidemic - An uncontrolled spread of a disease, usually resulting in the death of thousands.

Questions

1. What is a germ? (Use your dictionary)
2. Epidemic-type diseases can be spread by many methods. Name and explain three.
3. Make a written or oral report on;
   a. the black plague
   b. typhoid fever
   c. smallpox

HEALTH AND SANITATION

WHAT WILL THE STUDENT LEARN? Civilized man with his advanced scientific knowledge has been able to identify many ways to make vast improvements in health and sanitation facilities in many parts of the world, thus postponing deaths and adding to the population problem.

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student will write an essay explaining how civilized man with his advanced scientific knowledge has been able to identify many ways to make vast improvements in health and sanitation facilities in many parts of the world, thus postponing death and adding to the current population problem.

Read Chapter III of People.

Questions

1. About 200 years ago, smallpox was a common killer of thousands of people. Using library resources write a short essay about smallpox.
2. Explain the purpose of a vaccination.
3. For what was Edward Jenner famous?
4. Explain the disease cowpox.
5. Explain why Jenner somehow thought smallpox and cowpox were somehow related.
6. What were three terrible diseases that commonly killed many children in America many years ago?

DEATH RATE

WHAT WILL THE STUDENT LEARN? The student will learn that the scientific discovery of DDT led to the extermination of the malaria-carrying mosquito and other disease -carrying insects. This in turn led to an enormous and immediate drop in the death rate of Ceylon, thus adding to the population problem.

HOW WILL THE STUDENT DEMONSTRATE HE HAS LEARNED? The student will write a short essay explaining how the scientific discovery of DDT has added to the problem of increasing population.

On the island of Ceylon, off the southeast coast of India, the British army during World War II introduced modern public health aids such as DDT - a powerful new insect killer - to protect its soldiers from malaria. In 1947, Ceylonese medical teams sprayed DDT on fields, streets, and in houses.

One year later the Ceylonese death rate had dropped from 20 in 1947 to 14 people per 1000 in 1948. Malaria and other dieases carried by insects no longer killed so many people.

Following is a graph of the death rate of Ceylon. The death rate dropped from about 30 people per 1000 population in 1900 to under 10 per 1000 population in 1965. The most dramatic drop occured with the introduction of the DDT however. In this one year period the death rate dropped from 20 to 14 per 1000 population.*

death rate - The number of people per 1000 population who die in one year.

Questions

1. If you lived in a town in Ceylon with a population of 1,000, how many people would have died during: 1900? 1919? 1935? 1946? 1948?

*Robert C. Cook and Jane Lecth. People., 1968., pg. 35.

2. What caused the rapid decline in the death rate of Ceylon in the late 1940's?

3. What was the total decline in the death rate during the 65 year period?

4. On the graph, what does the vertical grid represent?

5. On the graph, what does the horizontal grid represent?

6. How many people died in Sedro Woolley during 1970? From whom would you find out?

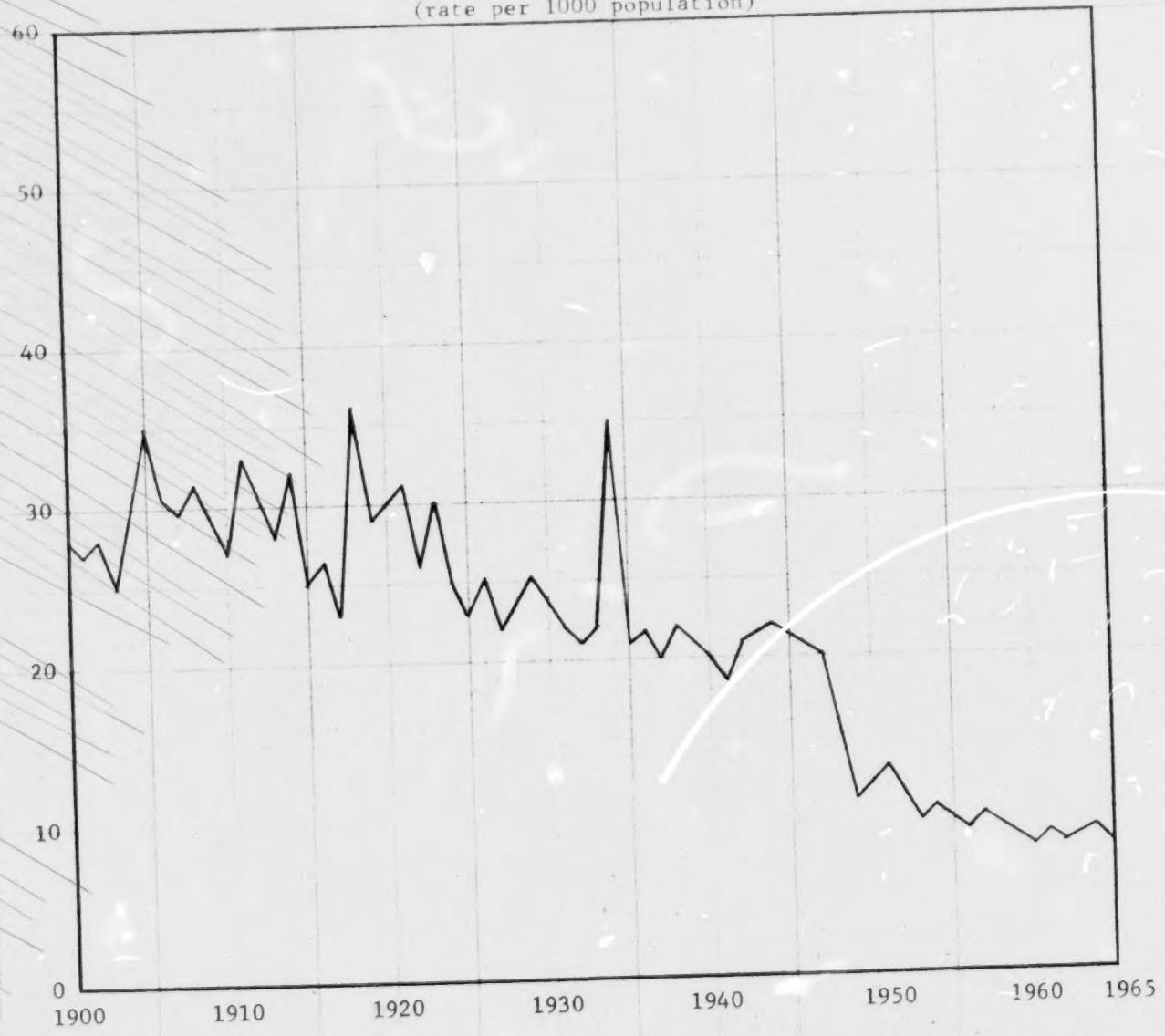
7. Write to some authority to determine how many deaths there were in Seattle during 1970. (Each student may write to a different city.)

8 What trend is represented in the graph?

9 What social, political, and economic problems might arise from such a drastic drop in the death rate as occurred from 1947 to 1948? i.e employment, schools, hospitals, highways, etc.

BEST COPY AVAILABLE

DEATH RATE IN CEYLON, 1900-1965
(rate per 1000 population)



BIRTH RATE

WHAT WILL THE STUDENT LEARN? The number of births per 1000 people is called the birth rate. In most countries the birth rate tends to remain quite stable.

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student will write a short essay defining birth rate, using examples to help explain. The student must identify the significance in the tendency for the birth rate to remain the same while the death rate falls.

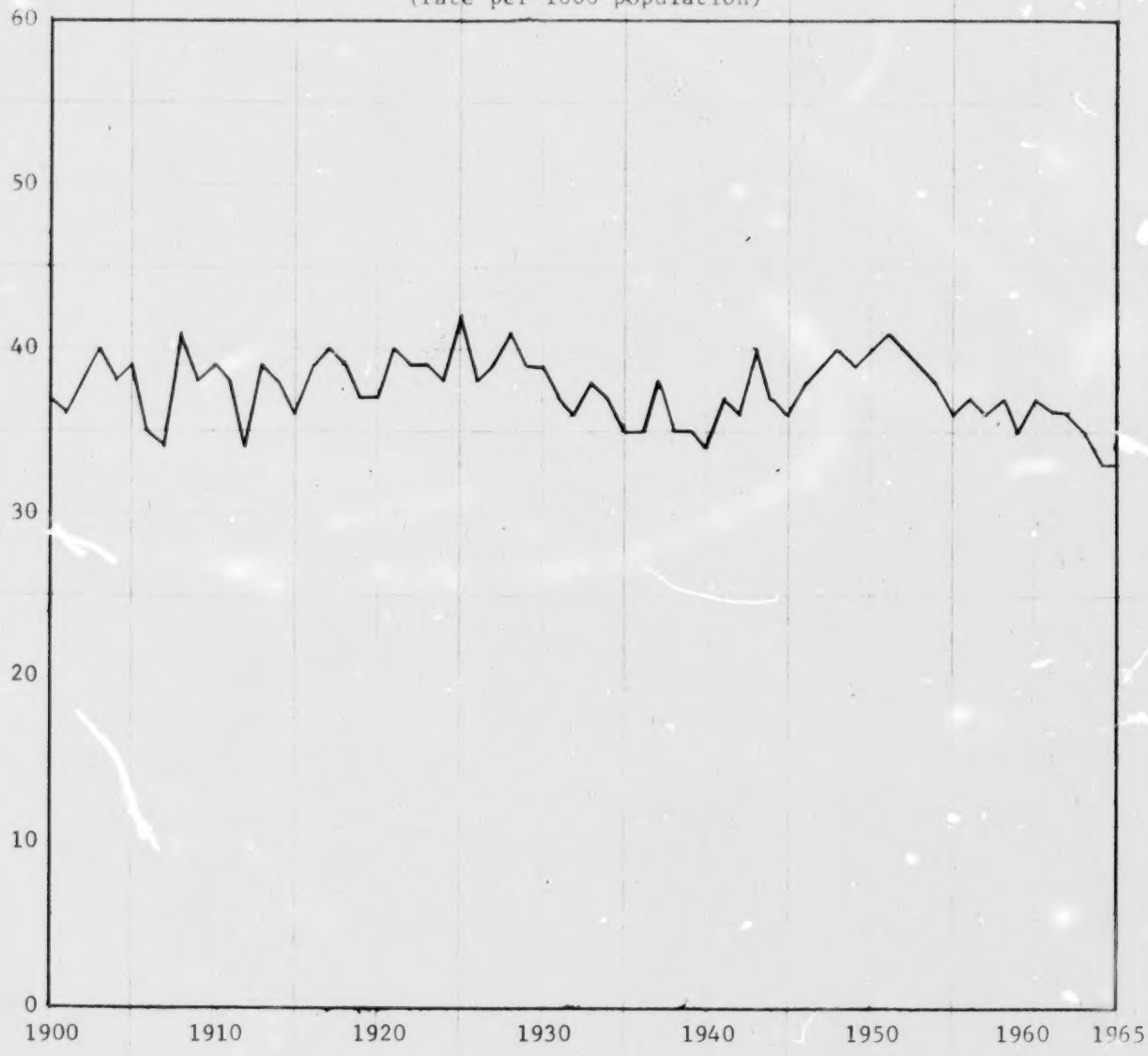
On the next page is a graph of the birth rate of Ceylon. As you can see, it fluctuates moderately from year to year. But over the period of 65 years, there has been little total change.

birth rate - the number of births per 1000 people in one year.

Questions

1. If you lived in a town in Ceylon that had a population of 1000 people, how many children were born in: 1900? 1919? 1935? 1946? 1948?
2. On the graph, what does the horizontal grid represent?
3. On the graph, what does the vertical grid represent?
4. How many children were born in Ceylon during: 1930? 1940? 1965?
5. During what period was the decline in the birth rate the greatest?
6. How many people were born in Sedro Woolley during 1970? From whom would you find out?
7. Write to some authority in Seattle to determine the number of recorded births in that city during 1970. To whom would you write? (Have each student write to a different city.)
8. Was there a trend in the birth rate in Ceylon? If so, what was it?

BEST COPY AVAILABLE



23600
09023

GROWTH RATE

WHAT WILL THE STUDENT LEARN? The rate at which any population grows is the difference between the birth rate and the deatl rate. Demographers call this the growth rate.

HOW WILL THE STUDENT DEMONSTRATE HE HAS LEARNED? The student will be provided birth and death rates for selected countries. From this data, he must calculate the net rate of increase in population growth.

You have studied graphs of birth rates and death rates. You have learned what has caused the potentially catastrophic increase in the world's population. If we combine the birth rate graph with the death rate graph, we can get a pictorial representation of this increase in population. Following is a graph representing this.

growth rate - the difference between the birth rate and the death rate.

PROBLEM

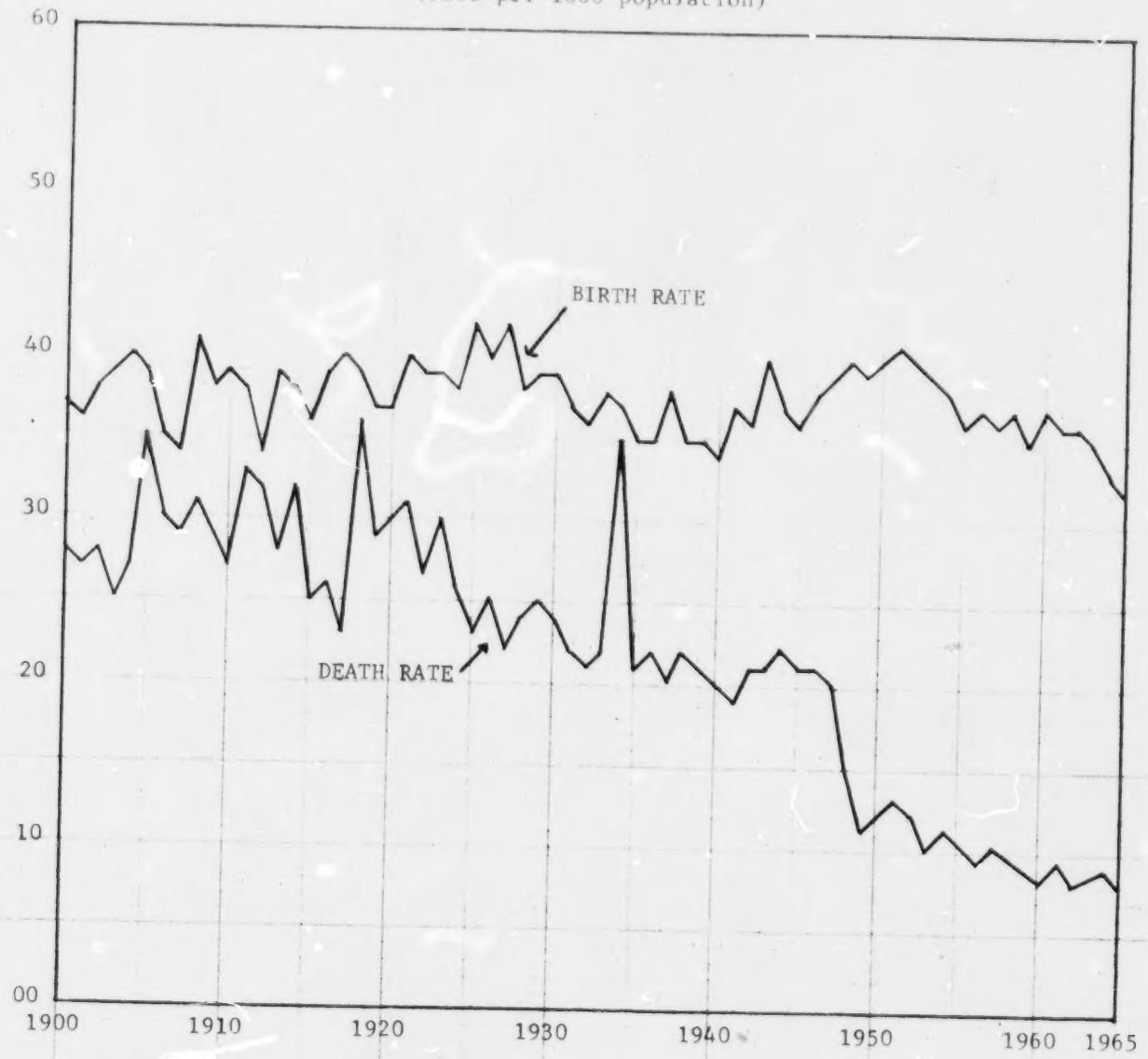
WHAT WILL THE STUDENT LEARN? By using the given data, the student will calculate the increase in the number of people in Ceylon during 1965.

HOW WILL THE STUDENT DEMONSTRATE THAT HE HAS LEARNED? The student must calculate the increase in population of Ceylon during 1965.

You are given the following data:

Death rate:	8 per 1000
Birth rate:	33 per 1000
Population:	12,000,000

BIRTH, DEATH, AND NATURAL INCREASE, CEYLON, 1900-1965
(rate per 1000 population)



BEST COPY AVAILABLE

POPULATION ESTIMATES

For illustrative purposes let us examine some projections that demographers have made. These are predictions of what the world's population may be by the year 2000, less than 30 years from now.

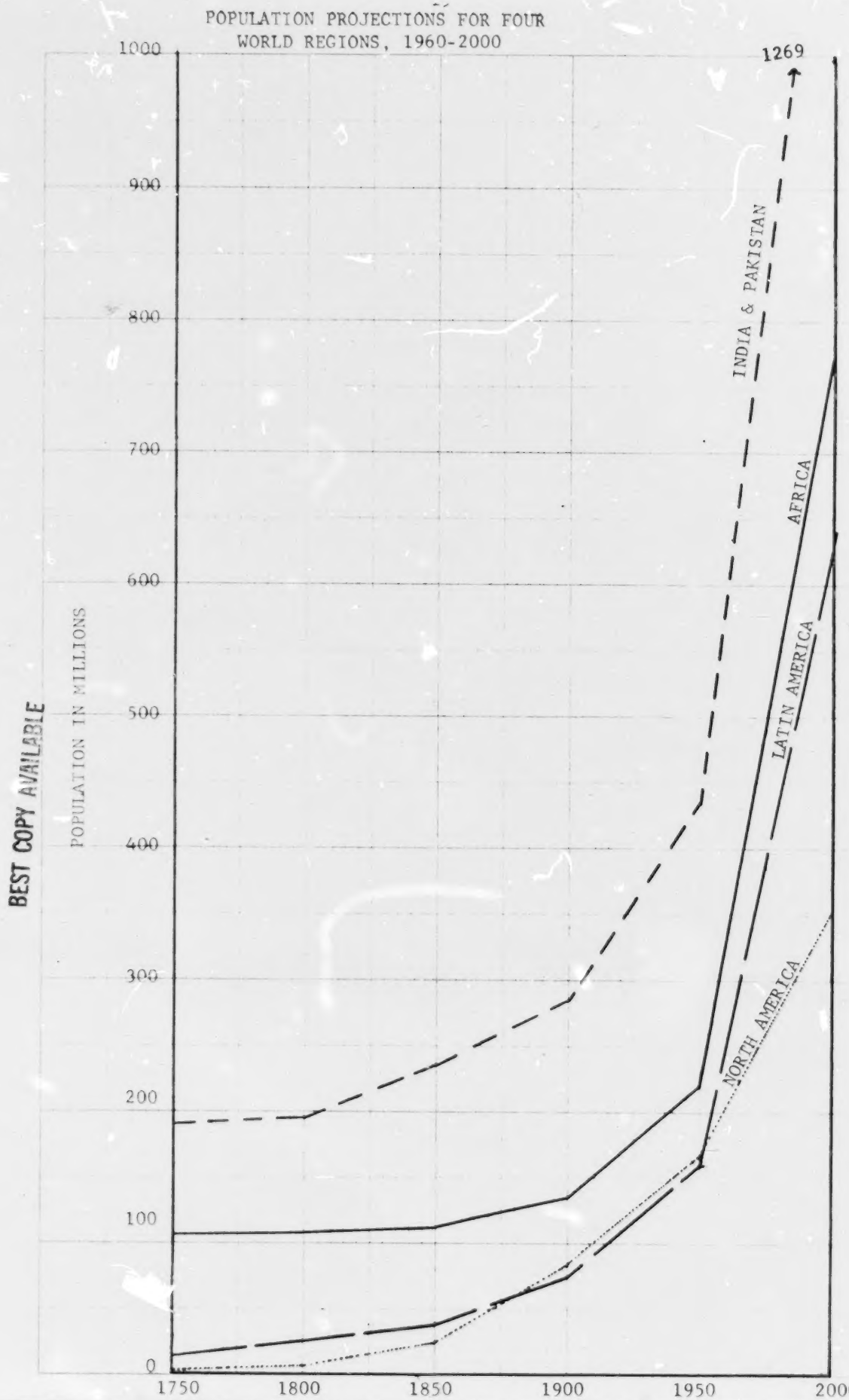
THE GROWTH OF POPULATION IN MAJOR AREAS 1750-1950
WITH PROJECTIONS FOR 2000 (POPULATIONS IN MILLIONS)

	1750	1800	1850	1900	1950	2000
Asia	498	630	801	925	1381	3458
China	200	323	430	436	560	1034
India and Pakiston	190	195	233	285	434	1269
Africa	106	107	111	133	222	768
Europe Excluding USSR	125	152	208	296	392	527
North America	2	7	26	82	166	354
South and Central America	16	24	9	74	162	638
Russia	42	56	76	134	180	353
Australia and Pacific Islands	2	2	2	6	13	32
WORLD	791	978	1262	1650	2515	6130

Questions

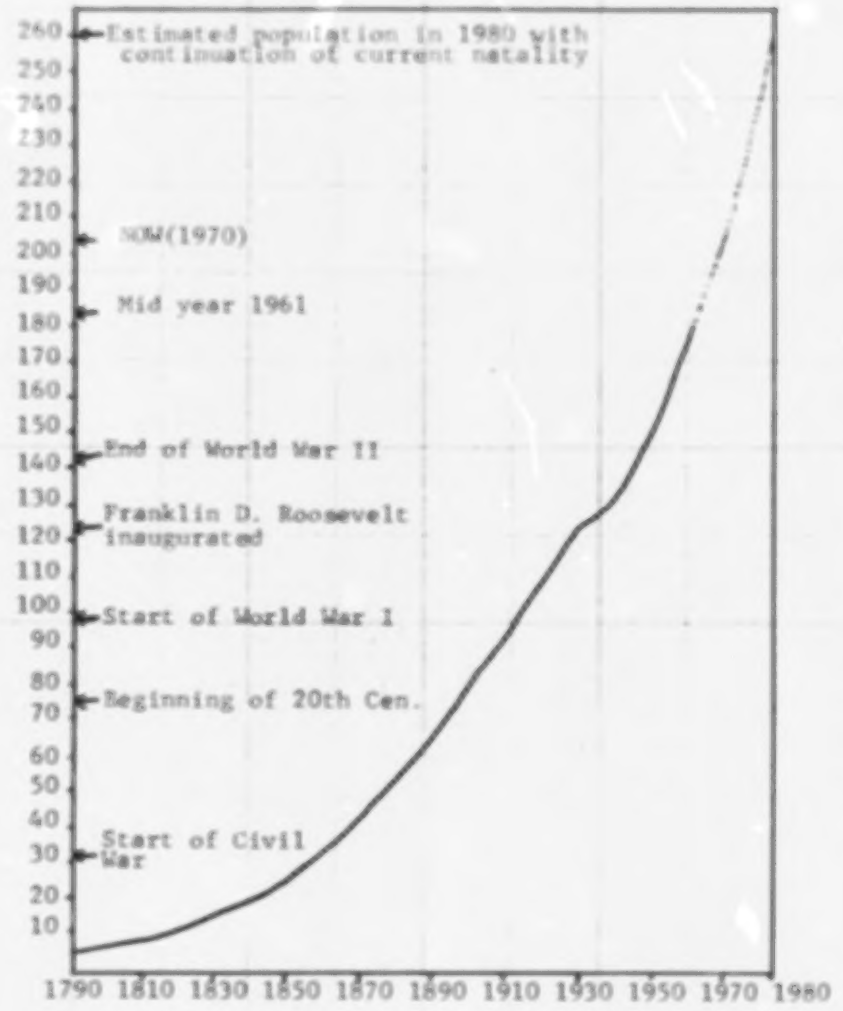
1. What is the present population of the state of Washington?
2. What is the present population of the U. S.?
3. What is the present world population?
4. By how many people did the world population increase from 1850 to 1900? From 1950 to 2000?
5. Which region is expected to have the largest population by 2000?

BEST COPY AVAILABLE



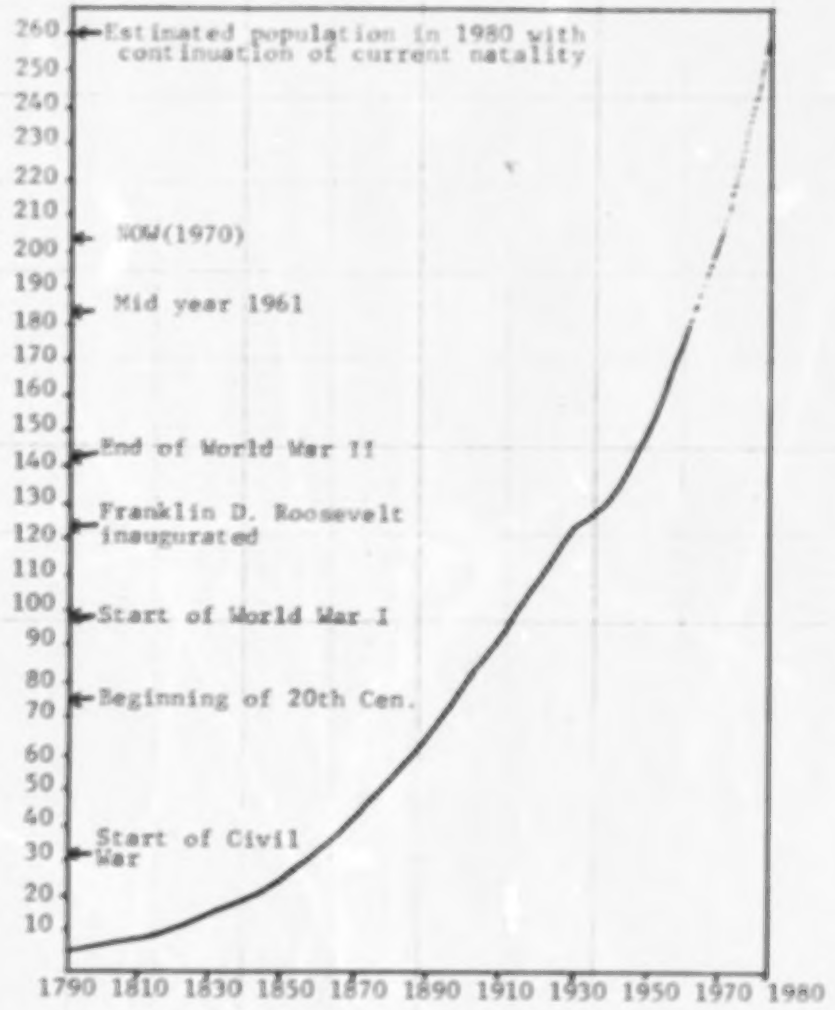
BEST COPY AVAILABLE

GROWTH OF UNITED STATES POPULATION
1790-1980



BEST COPY AVAILABLE

GROWTH OF UNITED STATES POPULATION
1790-1980



68000

BEST COPY AVAILABLE

In the preceeding pages you have been exposed to various kinds of population data. It has been preselected so as to introduce to you the basic cause of the population explosion and also to introduce to you the fundamental demographic terminology.

Now you are going to construct your own graph from given data. But you must first understand the data with which you will be working. This is important not only from the standpoint of constructing the graph, but also in relating the data to physical features on the earth and how man's existence and survival is influenced by the features.

For example, in 1970 North America had an estimated 233,000,000 people while South Asia had 1,094,000,000 people. Which area is more capable of supporting their respective populations? How can this question be answered? What factors must be considered?

We will begin our task by examining the data in the following table.

WORLD POPULATION BY MAJOR AREAS 1960-2000
ACCORDING TO THE HIGH VARIANT IN PROJECTION (millions)

AREA	1960	1970	1980	1990	2000
World total	3027	3702	4569	5632	6828
More developed areas	854	964	1086	1224	1377
Europe	425	458	492	526	563
Soviet Union	214	254	296	346	403
North America	199	233	275	323	376
Oceania	16	19	23	29	35
Less developed areas	2173	2738	3483	4408	5451
East Asia	830	1013	1236	1494	1731
South Asia	858	1094	1401	1768	2183
Africa	273	348	463	629	864
Latin America	212	283	383	517	673
Northern Areas	1668	1958	2299	2689	3073
Southern Areas	1359	1744	2270	2943	3755

Variant - The United Nations has made several estimates or projections about what the world's population will be during the next thirty years. Each of these estimates we call a variant. Table I represents the high estimate or variant.

TO THE TEACHER:
Have students make estimates of something immediate to them in order to give the child a more relevant meaning of variant. For example, from a comparison of boy/girl ratios of three different classes, they might estimate how many boys and girls in the entire school building or school district. Each of these would represent a variant.

DISCUSSION QUESTIONS

ELICIT SOME CLASS DISCUSSION ABOUT THE TABLE ON PAGE 21 USING THE FOLLOWING QUESTIONS.

1. What region had the most population in 1960? What was that population? In 2000?

2. By how many people is the population of this region expected to increase in forty years?

   In other words, demographers predict that in forty years the population of South Asia will increase by more people than the number there now, which took an estimated one million years to reach.

3. Locate South Asia on your world map. Locate and label the countries of the region.

4. What are the two largest countries of the region and what is the population of each? For the populations of specific countries, refer to the appendix.

5. What was the population of North America in 1960? What are the United Nations projections for the population of North America in 2000?

6. By how many people is the population of North America expected to increase by 2000?

7. In conclusion, we can say that the population of North America will almost _____ in forty years. On the other hand, South Asia which is smaller in area than North America but already has almost three times as many people, is expected to almost _____ in population.

8. One means of making something more relevant is to compare that thing with something else more familiar. Let us compare South Asia with North America by constructing a chart and gathering some information Below are suggestions for comparisons, you may think of others: Population density, land area, soil fertility, amount of natural resources, average annual income, literacy rate, climate, percentage of deserts and mountains, life expectancy. (See Maps)

9. The data is subdivided into two large subgroups. What are they?

10. What does More Developed and Less Developed mean? What are some of the characteristics of the people of each region?

11. What was the 1960 population of each of these two areas? What is the projected 2000 population of each of these two regions?

12. In question number five, we learned the total population of North America. How do those figures compare with those of Latin America? What differences do you find in the projections for the year 2000? Can you draw some conclusions about why the population of Latin America is expected to make such a sharp increase?

TO THE TEACHER:
To assist you in making these concepts more meaningful, use maps to show the various items mentioned in question number eight.

To show the concept of numbers of people and what too many people can be, use bottle caps and maps. Show the beginning (1960) population and the ending (2000) population for each of the two regions. For each 1,000,000 people use 1 or 2 bottle caps, either stacking or dumping them. Elicit some reactions from the students.

Elicit from the students a comparison of the population increases of the two regions. Use bottle caps and maps to compare.

ISSUES TO INVESTIGATE

The means by which population scientists, often called Demographers study the world population is to study past population trends. From past trends we can make reasonably accurate projections of what future populations might be.

In the following unit we are going to examine some of these population trends. In so doing, it is hoped that we can master the given behavioral objectives.

SEDRO WOOLLEY - MY HOME TOWN

IS THERE A TREND IN THE POPULATION GROWTH IN SEDRO WOOLLEY?

Below is data collected from the mayor's office. If an examination of the data is made, a very definite trend is obvious. The population of Sedro Woolley in 1940 was 3,550. Over a period of the next 30 years the population rose to 4,598 people, or an increase of about 27%.

However, one must recognize also that there was an even greater percentage increase in the total land area of Sedro Woolley, so one must not attribute the entire increase to more births than deaths. See data below.

AREA AND POPULATION OF SEDRO WOOLLEY, WASHINGTON; 1940 - 1970

YEAR	POPULATION	AREA (ACRES)
1940	3,550	768
45	"	"
50	"	"
55	"	"
60	3,705	"
65	3,850	832
70	4,598	1979

Questions

1. What has caused this increase in population?
2. Find out from your mayor those areas that have been annexed. Use a map to locate the annexed areas.
3. What part of the population increase was due to annexation?
4. Did this increase in population result in new business opening in Sedro Woolley?
5. Find out from your county recorder the number of births and deaths that have occurred in the past 1 year, 5 years, 10 years, 20 years if possible.

6. How has this increase in population changed your life?

7. Could you list some changes - social, economic, political, psychological, - that have occurred in your community because of this population increase?

8. Go into your community and determine what buildings are vacant. Can you guess why they are vacant? See if you can find out why they are vacant.

9. Find out from your parents all of the public services they are getting. What does each cost per month? Were these services available when your parents were children like yourselves?

10. In 9 above, does increasing population affect the cost of services?

11. Why is the old hospital building no longer in use?

12. Write an essay stating how you think the hospital might be used.

WHERE DO AMERICANS LIVE?

WHERE DO MOST OF THE PEOPLE OF THE UNITED STATES LIVE? The United States has experienced a very pronounced change in the living habits of its people. Whereas 200 years ago most of the people were rural dwellers, today most of the people are urban dwellers. In about 1800, a trend began - people were leaving the farms to live in the cities. This trend has continued to date and is not expected to change. In fact, demographers predict that a strong majority of the 80 - 100 million population increase that is expected in the next 30 years, in fact 90 percent, will live in cities.

THE URBANIZING UNITED STATES, 1800 - 1968 (IN THOUSANDS)

Year	Urban Population	%	Rural Population	%	Total Resident Population
1800	322	6	4,986	94	5,308
1830	1,127	9	11,739	91	12,866
1860	6,217	20	25,227	80	31,444
1890	22,106	35	40,841	65	62,947
1920	54,158	51	51,552	49	105,710
1950	96,847	64	54,479	36	151,326
1968	146,225	73	53,621*	27	199,846

* Estimate based on extrapolation from the 1950-60 period.

Rural - a word that means country.

Urban - a word that means city.

To The Teacher

In 1966, a Gallup Poll of urban dwellers showed that only 22% of the respondents preferred living in the city. By 1968 this had dropped to 18% and by 1970, to only 13%. So why are they still living in the city? The answer seems to be primarily economic; people live where employment can be found. Mechanization has reduced drastically the demand for farm labor, while affluence and prosperity has created a labor demand in the cities.

Questions

1. List five things that farm dwellers may have that city dwellers probably don't have.
2. How do these five things affect the farmers environment?
3. List five reasons why you might move to a city such as Seattle.
4. List five things that you would probably be required to give up if you moved to the city.

BEST COPY AVAILABLE

THE AUTOMOBILE

Since 1940 there has been an enormous increase in the number of motor vehicles on our highways. The data below indicates what the trend has been since that date. In all categories listed below there has been a substantial increase.

SAGA OF THE U. S. PASSENGER CAR

	1940	1950	1960	1967
U.S. Pass. Cars & Taxis Registered (thousands)	27,466	40,339	61,682	80,414
Total Mileage U.S. Pass. Cars (millions)	249,600	363,613	588,083	788,708
Total Fuel Consumption U.S. Pass. Cars (million gallons)	16,323	24,305	41,169	55,323
Pollutants Emitted by U.S. Passenger Cars (tons)				
carbon monoxide	n.a.	n.a.	46,000,000	61,000,000
hydrocarbons	n.a.	n.a.	14,000,000	16,000,000
nitrogen oxides	n.a.	n.a.	5,000,000	6,000,000
lead	n.a.	n.a.	160,000	210,000
World Registration Cars, Trucks, Buses	n.a.	70,424	126,908	200,582
U.S. Registration Cars, Trucks, Buses	n.a.	49,529	73,869	96,945
U.S. Share World Reg. Cars, Trucks, Buses	n.a.	70%	58%	48%

Questions

1. How has the automobile affected your life as a young child?
2. What things would you not have if the automobile were taken from you?
3. How much money does a new auto cost?
4. Try to figure out how much it costs to operate an auto for one month, including things such as insurance, license, taxes, gasoline, etc.
5. List the kinds of jobs that would be eliminated if we didn't have automobiles.

6. The data indicates that there were 80,414,000 autos in the U.S. in 1967. If each car used 750 gallons of gas per year, how much gasoline would be used by all cars in a year?

7. If it costs $150.00 for an anti-pollution device for a car, what would be the total cost to put devices on all the cars?

BEST COPY AVAILABLE

GROWTH IN LATIN AMERICAN CITIES

Below is data for capital cities of one of the Latin American countries. The trend is apparent. In all cases the population increased.

GROWTH OF STATE CAPITALS, 1960 - 1970
(Population in Thousands)

City	1960	1965	1970
Porto Velho	51	62	74
Rio Branco	47	62	80
Manaus	174	220	279
Boa Vista	26	31	35
Belem	399	499	625
Macapa	46	60	73
Sao Luis	159	196	242
Teresina	144	181	210
Fortaleza	509	699	960
Natal	161	207	265
Joao Pessoa	154	170	203
Recife	792	973	1,195
Macelo	169	200	237
Aracaju	115	139	169
Salvador	651	786	981
Belo Horizonte	686	956	1,333
Vitoria	85	109	140
Niteroi	244	280	320
Rio de Janeiro	3,265	3,826	4,483
Sao Paulo	3,676	4,827	6,339
Curitiba	357	502	707

Questions

1. In the 10-year period from 1960 to 1970, which city had the largest population increase? Which had the least?

2. What was the total population of the capital cities in 1970?

3. What was the largest city, the smallest, for each year?

4. If growth continues as it has this past 10 years, what do you estimate the population of Porto Velho will be in 1980?

REVIEW AND PRACTICE

TO THE STUDENT: This is Overpopulation

Everything that you have encountered in this unit thus far has suggested that the world is becoming over-populated. Over-population is not an easy word to define, because it is relative to economics and social conditions in a given society. But some illustrations will help. For instance:

IT TOOK MANKIND THE WHOLE PERIOD OF RECORDED TIME UNTIL THE EARLY NINETEENTH CENTURY TO ACHIEVE A POPULATION OF ONE BILLION. IT TOOK ONLY A CENTURY TO ADD THE SECOND BILLION. IT TOOK SOMEWHAT OVER THIRTY YEARS TO RAISE THE WORLD POPULATION TO THREE BILLION. AND, AT THE PRESENT RATE OF INCREASE, ONLY FIFTEEN YEARS WILL BE REQUIRED TO BRING THE FIGURE TO FOUR BILLION.

NOT ONLY IS WORLD POPULATION GROWING, BUT THE RATE OF POPULATION GROWTH KEEPS GOING UP. OVER THE LAST EIGHTY YEARS, THE RATE OF DOUBLING HAS DOUBLED.

TO PUT IT ANOTHER WAY: IN 1900, WORLD POPULATION INCREASED BY ABOUT 40,000 PEOPLE EVERY DAY; NOW IT IS INCREASING BY 180,000 EVERY DAY. AND THE RATE IS GOING UP.

TO PUT IT ANOTHER WAY: THE WORLD IS NOW ADDING TO ITS POPULATION ABOUT 125 PEOPLE EVERY MINUTE, 7500 EVERY HOUR, MORE THAN A MILLION EVERY WEEK, AND 65 MILLION EVERY YEAR.

PROBLEM STUDY AREAS

1. Ground water table level
   Study some of the wells of Skagit County. Measure the water level of the wells at different times of the year. Measure it daily for a period of time. Does the level vary much? What causes the level to change? Can you find out if the level has changed any during the past fifty years. Is there any apparent trend?

2. Water content
   Select several rivers or streams in your area. Measure the oxygen content at selected times of the year. Does it vary much? Why? Why is the oxygen content of water important? What are some things that can affect the content of oxygen in the water?

3. Air Pollution Authority
   Find out what you can about the Northwest Air Pollution Authority. What is its purpose? How does it affect your life? What good things does it do? What are some bad things that it does? Attend one of its meetings. Study some of the laws that it is supposed to enforce. Study and learn about some of the tests that it makes. Invite someone from its office to speak to your class. If there were fewer people in Washington would it be necessary for this agency to exist? How do people affect pollution, how does pollution affect people?

4. Land Management
   Many parts of the world have a severe food shortage. Thousands of people die daily from starvation. One way that more food could be produced is by better utilization of the land. Make a study of the Skagit Valley area to determine the amount of fertile farmland that is wasted as a result of its use for roads, parks, homesites, and other uses rather than for farming. Then determine how much food might be produced on that land.

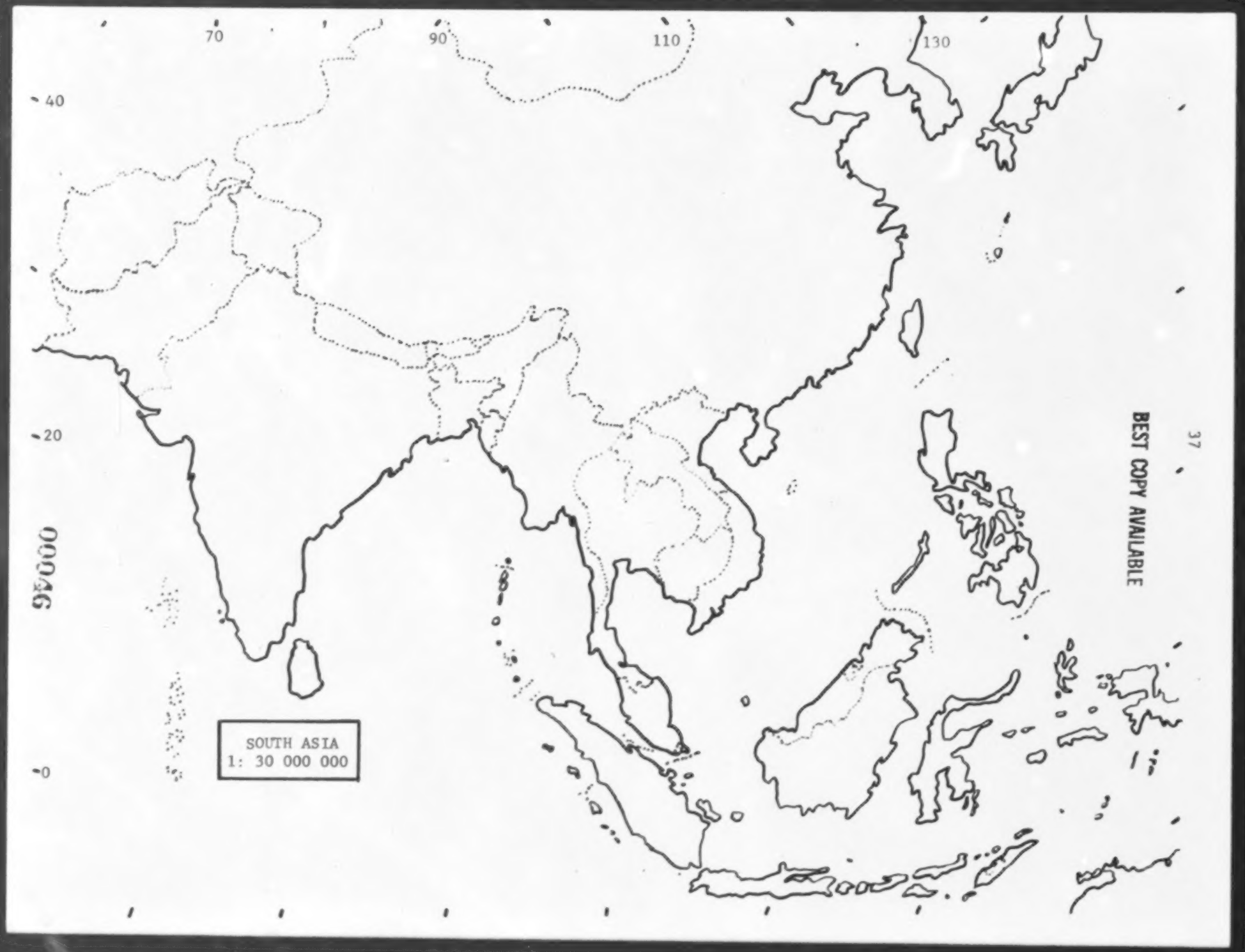
5. Pollution Map
   Prepare a pollution map of a particular region---Skagit Vally, Skagit County, Northwest Washington, etc. On the map locate the polluters and the kinds of pollution. If fewer people lived in the region would there be less pollution? Why? How do people influence the kinds and amounts of pollution? Northern State Hospital is one of the largest employers in the region. It is also what we call a non-polluting employer. Would you like to see it closed down and replaced with some type of polluting company that would hire twice as many people as Northern State employs?

6. Join with some High School students in solving these and any other problems.

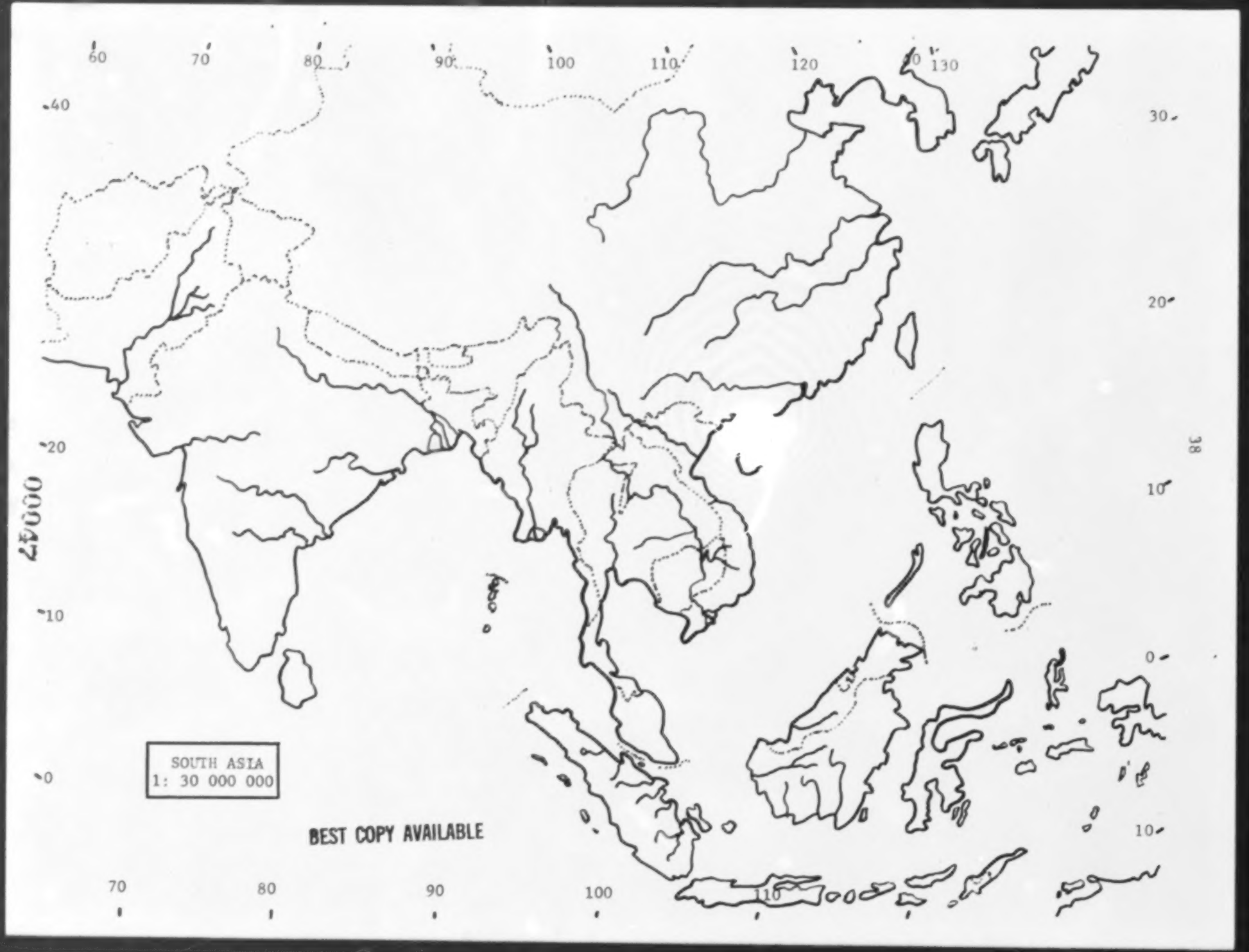
7. Newspaper Articles
   Subscribe to the newspaper for a period of time. Examine it for articles about the population problem. Where are the articles found in the paper? Are the articles fairly presented? What is the attitude of the author? Is the paper giving an appropriate amount of space to the subject of population?

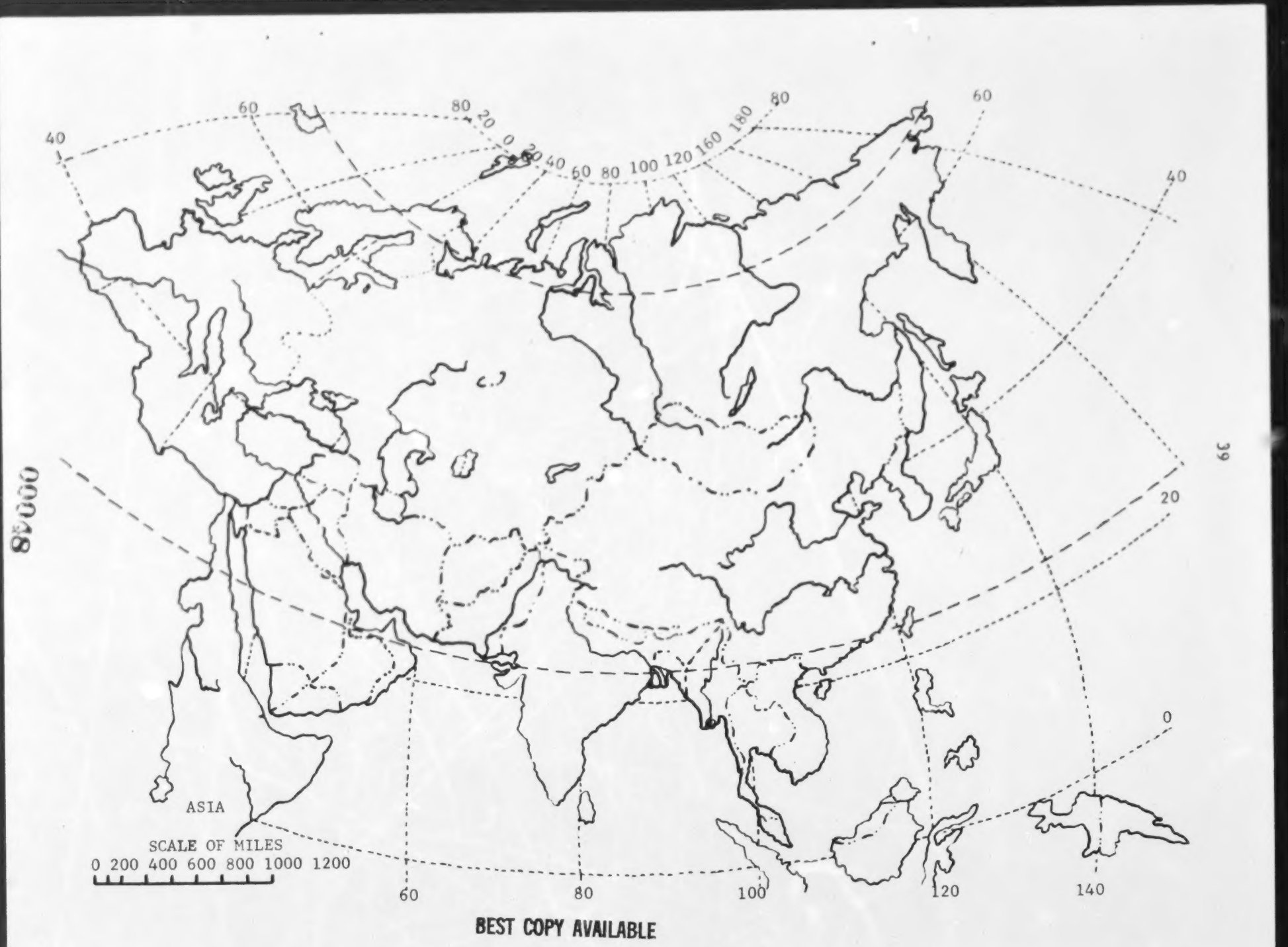
8. Family Planning Legislation
   Find out if you can which states have some type of law that in some way limits the number of people the earth will have. What are some of the characteristics of the programs under these laws?

9. Population Control
   Write to some private or governmental organizations that are involved in programs of population control. Your teacher has a list of some of these organizations with their addresses. What are they doing in order to limit the numbers of people being born? Do you agree with what they are doing? Why?



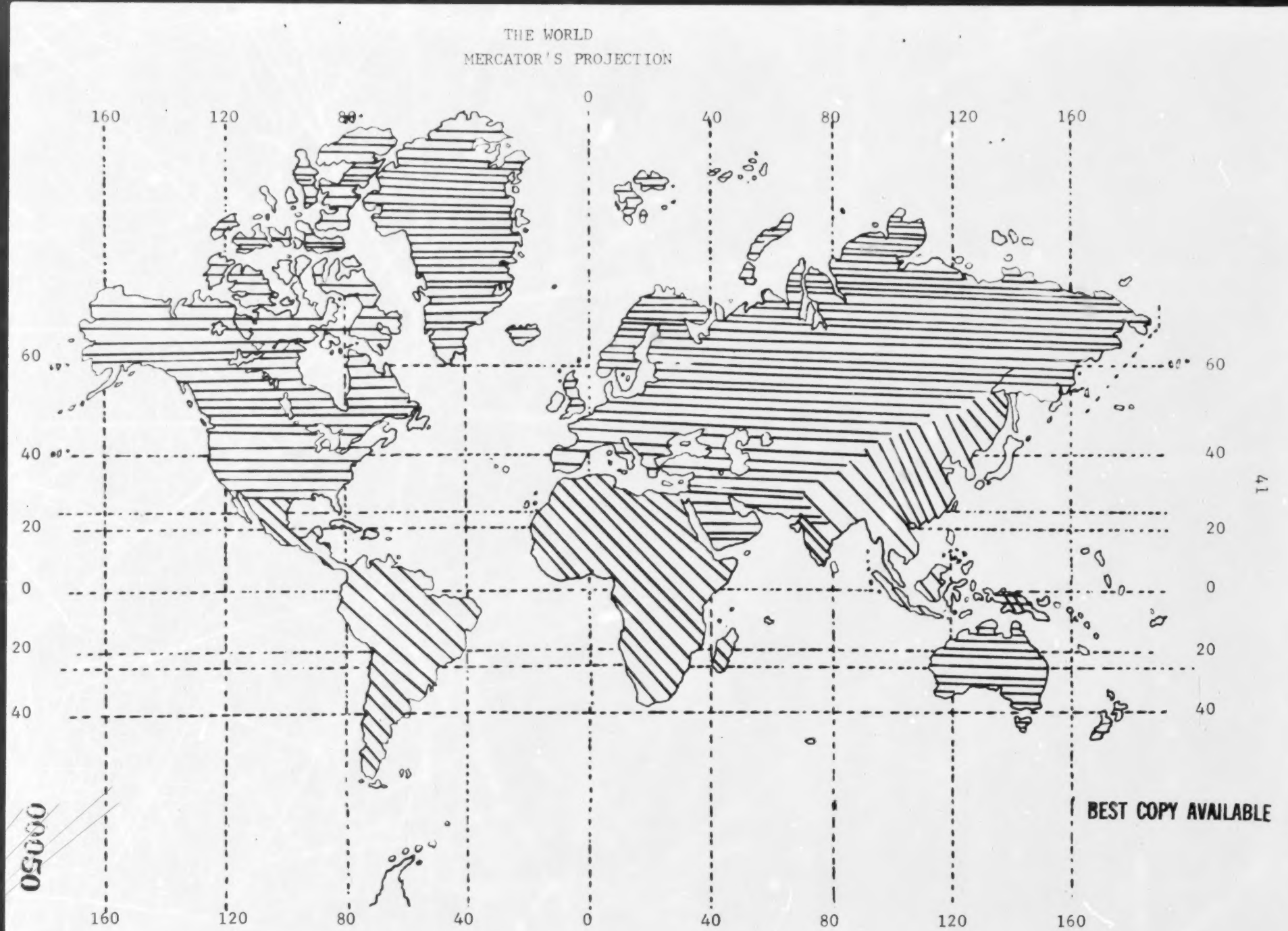
BEST COPY AVAILABLE


60
70
80
90
100
110
120
130
40
30
20
10
0
SOUTH ASIA
1: 30 000 000
BEST COPY AVAILABLE
70
80
90
100
110
10



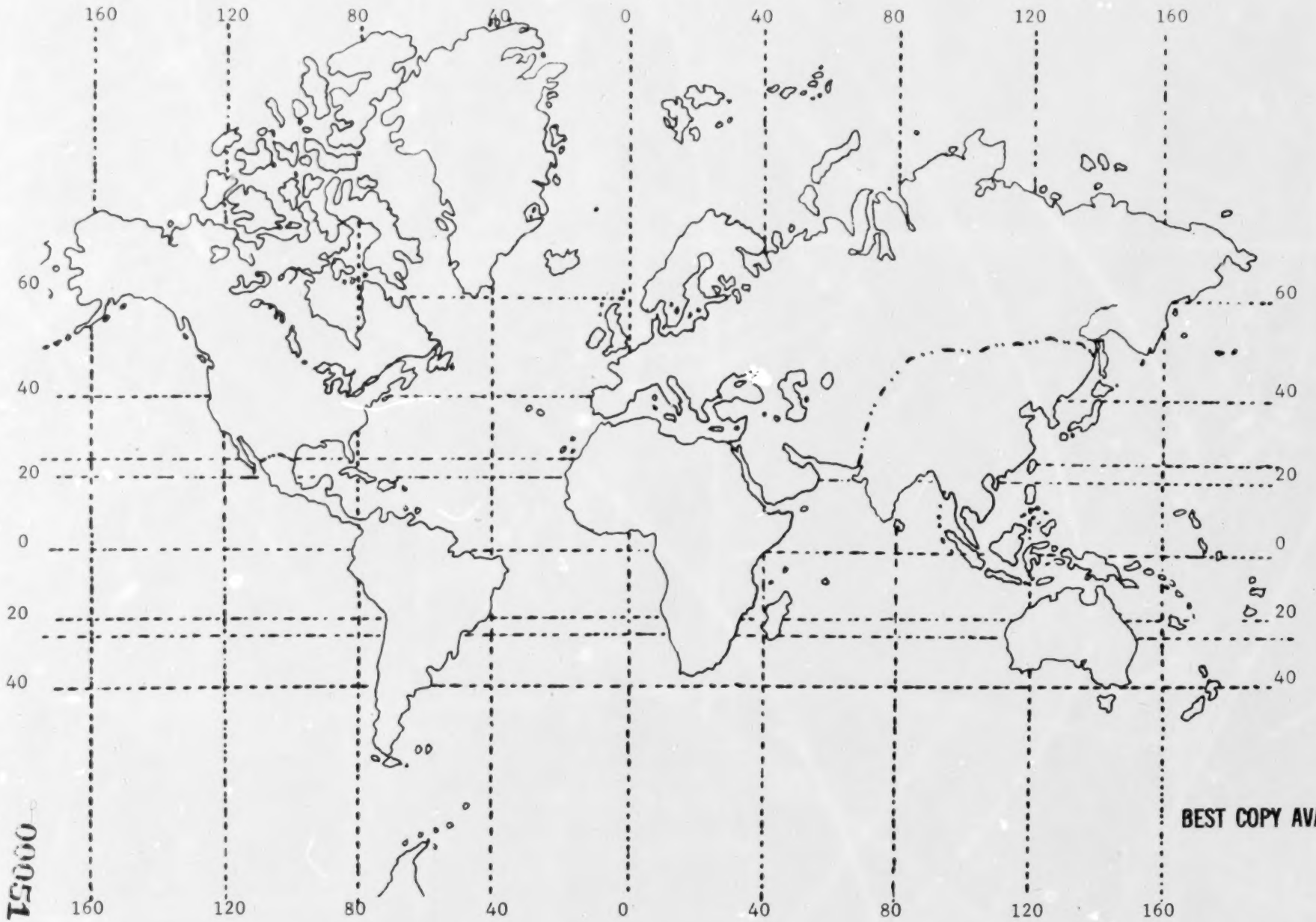
BEST COPY AVAILABLE

BEST COPY AVAILABLE


THE WORLD
MERCATOR'S PROJECTION
0
160
120
80
40
0
40
80
120
160
60
40
20
0
20
40
60
40
20
0
20
40
160
120
80
40
0
40
80
120
160
05000
00750
BEST COPY AVAILABLE

THE WORLD

MERCATOR'S PROJECTION



BEST COPY AVAILABLE

T5066 00051

BIBLIOGRAPHY

Cook, Robert C. and Lecth, Jane. People. Columbia Books Publishers, Washington, D.C., 1968, page 35.

_____ "The Population Challenge of the 70's." Population Reference Bureau Bulletin. V. 16, No. 1, February 1970, page 12.

_____ "Brazil: A Prodigy of Growth." Population Reference Bureau Bulletin. V. 25, No. 4, September 1969, page 106.

Wrigley, E. A. Population and History. World University Library, McGraw-Hill Book Company, 1969, page 205.

00052

APPENDIX

HOW DID EARTH'S POPULATION GET SO BIG?

If someone told you that someday in the future, the earth will have twice its present population, perhaps you wouldn't care too much. But suppose you were told that the population might double in just 35 years, when you may be about as old as your father is now. This is very likely to happen. What will it mean to you?

Concern about our increasing population is still new. When your parents were your age, they had never even heard about a population "explosion." But today we know that our growing population is a grave problem.

How did this crisis develop so recently and so quietly? Let's look back. Let's try to find out how it happened. Let's go back to the days of the caveman, when earth's human population was very small.

The Struggle to Survive

One hundred thousand years ago there were very few human beings on earth. Small groups of people lived in caves. Imagine how hard it was to stay alive then. Everytime a family wanted something to eat, the men had to go out and look for it. They had to kill an animal, catch a fish, or gather nuts or berries. If they were unlucky that day, the family would have nothing to eat. Only a few grasses and plants were suitable for the human diet. In winter, these cave people were often cold, even when they wore clothes made from animal fur. They had no stoves and for a long time they did not even know fire. Still, it was not always so hard. If the hunting was good, there would be food. But early man's existence swung back and forth from feast to famine, and many people died of hunger.

There were, of course, no doctors like those we have today. When children got sick their parents tried to help, but the children often died. Mothers had many babies, but most of them did not live very long.

Through storms, hunger, disease and war, early man struggled for a long time just to stay alive. But he survived. Man has been on earth for perhaps a million years. Most of this time he led a very uncertain existence, and his numbers increased very slowly. In some periods more people died than were born and the population declined. Sometimes whole tribes died of hunger and disease or were wiped out by their enemies. But little by little over the centuries people began to live longer. The human population slowly grew.

Man lived for many hundreds of thousands of years on earth without facing the problems of crowding. But about 8,000 years ago, as he began to build cities and raise crops, his numbers started to increase more rapidly. Food became more abundant and larger numbers of people could be provided for. When families didn't have to spend most of their time in the hunt for

*Robert C. Cook and Jane Lecth. People. Columbia Books Publishers, Wash., D.C., 1968., Chapter III.

food they had time for other things. They could make better clothing out of skins. They learned to weave cloth, to make things out of metal and clay, and to build better shelters.

Such changes came very slowly and took thousands of years. But they meant a very important thing. Man was beginning to control his surroundings and provide for his future. Because he could control his world to some extent, he was no longer completely at the mercy of nature - its food shortages, its weather, its diseases. Man's food supplies grew. His diet and his health improved. Relatively fewer children died. As a result, the human population began to increase a little faster.

Still, it did not grow nearly as fast as today. Why not? What held it back?

Disease Kept the Population from Growing Fast

Despite his increasing skill with crops, building and tool-making, early agricultural man still knew little about the most important thing of all - himself. He knew little about what made him sick or die, or about how his own body worked.

This ignorance of the workings of the human body, and of germs and diseases, lasted for thousands of years. It did not prevent man from building up some very advance civilizations. Five thousand years ago, people lived in towns with fine buildings. In Egypt, the Middle East, China and later Greece, people wrote great books, carved beautiful statues, built great palaces, temples and monuments, and painted beautiful pictures. But man had little idea of what caused the sicknesses that sometimes wiped out whole towns.

Even the best doctors of Egypt and Greece understood little about diseases or about how to cure them. Along with their patients, they had little idea of the importance of being clean. They seldom washed their hands or their instruments after taking care of sick people. As a result they helped spread the very infections they were fighting against.

In those times and until very recently, people in most countries threw garbage and body wastes out into the street. Rats lived on the garbage. Lice lived in the fur of the rats and carried typhus from the rats to people. Other diseases travelled in different ways - through contaminated rinking water, through bad food, and from one person to another. But people did not know this.

The world suffered from terrible epidemics which swept through cities and countries, leaving few people alive. Killers such as the black plague, typhoid fever and smallpox destroyed large segments of the population in a few months. First a few people would become sick, then more. In a short time a whole neighborhood would be infected, and then an entire city. Sometimes an epidemic would attack a whole continent. The black plague is an example. From 1347 to 1351 this disease raged through Europe like a huge fire, killing millions. Whole districts were left with few

inhabitants. After the black plague had run its course, it took several generations for the European population to regain its previous size.

Famines Kept the Population from Growing Fast

Another reason why the human population grew slowly was famine. Until recently, massive food shortages periodically struck large areas of the world, and many thousands of people starved to death. There were several reasons. Locusts sometimes ate the crops of an entire country. Long rainless periods known as droughts were equally harmful. And poor farming methods ruined vast areas of soil.

Sometimes, if people had grain left over from a previous harvest, they could eat that during a famine. In most years, however, they grew only enough food to last until the next harvest and none was left over. Sometimes starving people became so desperate they ever ate the seeds being saved to plant the next year's crop. This meant no crop next year, and no food. Usually they could expect no help from other areas where food might be more abundant, because there were few roads, horses or carts.

Disease and famine have killed many, many people, but vast numbers have also died during war. From the beginning of history, man has fought with man first in tribes and later in whole countries. You may think that in war most of the dead die in battle. This is seldom true. Usually more civilians die than soldiers. It isn't only the actual fighting that kills people. More people have been killed by the famines and epidemics that wars have brought.

So the three big killers have been disease, famine and war. Sometimes diseases and famine occurred together, as they did in the first colonies in America. In 1607, 108 settlers from England tried to start a new life in Jamestown, Virginia. Thirty-nine died during the first six months. In 1620, as you know, the Pilgrims landed on Plymouth Rock. After six months of famine and desease, over a third of the original 102 colonists had died. This sort of calamity happened over and over again and over the world. In many countries it was worse than in America.

A Great Medical Discovery

Then something wonderful happened. Man learned that many diseases were caused by tiny organisms called "germs." He began to learn much more about the human body and how it worked. He began to learn about the importance of cleanliness. Most important of all, he began to learn how to control or stop some deadly diseases that had previously killed many people.

Less than two centuries ago in Europe, one of the deadliest killers was smallpox, a disease that covers its victims with foul-smelling sores. Many died, and those who survived smallpox were often left blind or pock-marked with scars on their faces and bodies. In some towns almost all the people had scarred faces.

Smallpox remained a great curse until the end of the 18th cnetury, when a powerful weapon against it was discovered. Look at your arm or leg where you have had a vaccination. Do you remember when you got it? Do you remember how the doctor took a needle and scratched some vaccine into your arm? Do you remember the sore that formed? That was your vaccination. It protected you against smallpox.

Vaccinations were unheard of until the time of Edward Jenner, an English country doctor who devoted his life to finding a cure for smallpox. During his search he remembered an ancient belief of English farmers that people who took care of cows seldom got smallpox. Jenner noticed that dairy farmers and milkmaids often did get a very mild disease called cowpox. He wondered about this, and guessed that people who had had cowpox might in some way have become protected against smallpox. Everybody thought this was crazy, but Jenner decided to test his idea. One day, in 1796, he took a needle, rubbed the tip across a cowpox sore on a girl's hand, and then used it to scratch the arm of a small boy. In a few days, the boy had a cowpox sore on his arm, just like yours, which soon disappeared. The boy never afterwards got smallpox. This was the first smallpox vaccination and it worked!

Most of the doctors, lawyers and clergymen of Jener's day were bitterly opposed to his "crazy idea." But it gained popular support very fast. Before Jener's discovery, about 2,000 Londoners died of smallpox every year. After vaccination was generally accepted in England, smallpox almost disappeared from that country.

Now We Can Save Many Lives

Dr. Jenner's great discovery was only one of the many scientific discoveries that began to save lives. Soon, new medical knowledge enabled doctors to keep people from getting diseases such as diphtheria, whooping cough, malaria, cholera and yellow fever. And if some people were unlucky enough to get these diseases, doctors often knew how to cure them, and how to keep the diseases from spreading and causing epidemics.

Doctors quickly learned that more lives could be saved by preventing illnesses than by trying to cure people who were already sick. When you were a baby, you were probably taken to the doctor for shots against diphtheria, typhoid fever and whooping cough. Many American children died of these diseases a century ago. Today very few children get them, and those who do almost always survive. Even in the poor countries, death rates from these ancient killers are dropping fast.

Typhoid fever, a terrible disease that used to kill many people, was spread through polluted drinking water and bad milk. Today, except in some farm areas, the water that comes out of the faucet is filtered and chlorinated to make it safe. Milk is pasteurized to kill harmful germs. The milk you drink comes in sterilized bottles or clean cardboard containers.

Until recently, many people in large areas of the world were endangered

by mosquitoes that carried a disease called malaria. The mosquitoes lived in swamps, and they spread malaria to nearby human communities. Today many of these swamps have been drained. Others have been sprayed from airplanes with mosquito-killing chemicals. In addition, scientists have discovered a drug which prevents malaria from harming the few people who still get bitten by disease-carrying mosquitoes. Man can now live and work in many regions where it was once impossible to survive.

New drugs, better sanitation and new chemicals such as the anti-mosquito spray have vastly improved health conditions around the world. Hospitals are more numerous and better than ever. Years ago, most babies were born at home to poor and wealthy parents alike. The three most recent Presidents, Kennedy, Johnson and Nixon, were born in a bedroom in the houses of their parents. Today, most American babies are born in hospitals, where they can be given excellent care from the first moments of their lives. As a result, millions of babies who in earlier times would not have survived to their first birthday now grow up to become healthy adults.

More People Live Longer

You can see that medicine has made great progress since Dr. Jenner's day. Many things are now being done to keep people healthy, and most people live longer than their ancestors did.

In the United States today, 98 out of every 100 babies reach their first birthday. In 1900, however, only 84 out of 100 managed to live to the age of one. The other 16 died while they were still infants. When George Washington was President, an American baby had an even chance of living to be 35. Today an American baby has an even chance of living to be 70.

The new methods of keeping people healthy and of giving them longer lives were first used in northern Europe and North America. They gradually spread all across Europe and into the Soviet Union, Japan, New Zealand and Australia. Within the last 50 years they have been used with dramatic results throughout most of the rest of the world.